

Amendments to the Claims:

1. (Currently amended) A method of detecting a target molecule (20), comprising the steps of:

i) contacting a sample with a locator probe (10,30) comprising a binding moiety (11,31) specific for ~~said~~ the target molecule (20) and an amplification nucleic acid sequence (12,32) to produce a target molecule-locator probe complex;

ii) producing an amplification structure bound to ~~any the complex produced in the preceding step~~ by performing one or more times ~~the~~ an amplification step of treating ~~said the~~ sample and locator probe (10,30) with:

a) a single stranded amplification template (40,50) comprising:

i) arranged in a 5' to 3' direction:

a) an extension nucleic acid sequence (41,51);

b) a hybridisation nucleic acid sequence (42) complementary to the amplification nucleic acid sequence (12,32,52) ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step and~~ having substantially the same sequence as ~~said the~~ extension nucleic acid sequence (41,51); and

c) an amplification moiety (43,53), being limited in all but the final repeat to a nucleic acid sequence; and

ii) optionally comprising at least one signal moiety being other than a nucleic acid sequence;

b) a polymerising agent ~~capable of extending~~ which extends the 3' terminus of the amplification nucleic acid sequence (12,32,53) ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ by synthesising a complementary strand to ~~said the~~ extension nucleic acid sequence (41,51) of ~~said the~~ amplification template (40,50);

c) a separating agent ~~capable of removing~~ which removes sufficient of ~~said the~~ extension nucleic acid sequence (41,51) of ~~said the~~ amplification template (40,50) when hybridised to ~~said the~~ complementary strand to allow subsequent hybridisation of ~~said the~~ hybridisation nucleic acid sequence (42,52) of ~~said the~~ amplification template (40,50) to ~~said the~~ complementary strand; and

d) the reagents and conditions necessary to effect the action of ~~said the~~ polymerising agent and separating agent to allow the extension of the 3' terminus of the amplification nucleic acid sequence (12,32,53) ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ by the synthesis of a plurality of sequences complementary to ~~said the~~ extension nucleic acid sequence (41,51) of ~~said the~~ amplification template (40,50);

iii) detecting any bound amplification template (40,50) from the amplification step or steps; and

iv) correlating the results of the detection step (iii) with the presence of ~~said~~ the target molecule (20).

2. (Currently amended) A method for detecting target molecule according to claim 1, ~~wherein the removal of said extension nucleic acid sequence (41,51) being achieved by the use of the separating agent is~~ a 5' double stranded exonuclease ~~against whose~~ the activity against which the hybridisation nucleic acid sequence (42,52) is protected.

3. (Currently amended) A method for detecting a target molecule (20) comprising the steps of:

i) contacting a sample with a locator probe (~~110~~) comprising a binding moiety (~~111~~) specific for ~~said~~ the target molecule (20) and an amplification nucleic acid sequence (~~112~~) to produce a target molecule-locator probe complex;

ii) producing an amplification structure bound to any complex produced in the preceding step by performing one or more times the amplification step of treating ~~said~~ the sample and locator probe (~~110~~) with:

a) a single stranded first amplification template (~~70,90~~) comprising:

i) arranged in a 5' to 3' direction:

a) an extension nucleic acid sequence (~~71,91~~);

b) a hybridisation nucleic acid sequence (~~72,92~~)

~~complementary to the amplification nucleic acid sequence (93,103,112) of the previous amplification step or, where there is no previous amplification step, of the preceding step and~~ having a substantially different sequence to ~~said~~ the extension nucleic acid sequence (~~71,91~~); and

c) an amplification moiety (~~73,93~~), being limited in all but the final repeat to a nucleic acid sequence; and

ii) optionally comprising at least one signal moiety being other than a nucleic acid sequence;

b) a single stranded second amplification template (~~80,100~~) comprising:

i) arranged in a 5' to 3' direction'

a) an extension nucleic acid sequence (~~81,101~~) comprising ~~said~~ the hybridisation nucleic acid sequence (~~72,92~~) of ~~said~~ the first amplification template (~~70,90~~);

b) a hybridisation nucleic acid sequence (~~82,102~~) comprising the extension nucleic acid sequence (~~71,91~~) of ~~said~~ the first amplification template (~~70,90~~); and

c) an amplification moiety (~~83,103~~), being limited in all but the final amplification step to a nucleic acid sequence; and

ii) optionally comprising at least one signal moiety being other than a nucleic acid sequence;

c) a polymerising agent ~~capable of extending~~ which extends the 3' terminus of the amplification nucleic acid sequence (93,103,112) ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ by synthesising a complementary strand to ~~said the~~ extension nucleic acid sequence (71,81,91,101) of ~~said the~~ first and second amplification templates (70,80,90,100);

d) a separating agent ~~capable of removing~~ which removes sufficient of ~~said the~~ extension nucleic acid sequence (71,81,91,101) of ~~said the~~ first and second amplification templates (70,80,90,100) when hybridised to ~~said the~~ complementary strand to allow subsequent hybridisation of ~~said the~~ hybridisation nucleic acid sequence (72,82,92,102) of ~~said the~~ first and second amplification templates (70,80,90,100) to ~~said the~~ complementary strand; and

e) the reagents and conditions necessary to effect the action of ~~said the~~ polymerising agent and separating agent to allow the extension of the 3' terminus of the amplification nucleic acid sequence (93,103,112) ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ by the synthesis of a plurality of sequences complementary to ~~said the~~ extension nucleic acid sequences (71,81,91,101) of ~~said the~~ first and second amplification templates (70,80,90,100);

iii) detecting any bound first and/or second amplification template from the amplification step or steps; and

iv) correlating the results of the detection step (iii) with the presence of ~~said the~~ target molecule (20).

4. (Currently amended) A method of detecting a target molecule (20) according to claim 3, ~~the removal of said extension nucleic acid sequence (71,81,91,101) of said first and second amplification templates (70,80,90,100) being achieved by the use of~~ wherein the separating agent is a 5' double-stranded exonuclease against whose , the activity against which said the hybridisation nucleic acid sequence (72,92) of ~~said the~~ first amplification template (70,90) and ~~said the~~ hybridisation nucleic acid sequence (82,102) of ~~said the~~ second amplification template (80,100) are protected.

5. (Currently amended) A method for detecting a target molecule comprising the steps of:

i) contacting a sample with a locator probe comprising a binding moiety specific for ~~said the~~ target molecule and an amplification nucleic acid sequence to produce a target molecule-locator probe complex, ~~said the~~ amplification nucleic acid sequence having one or more restriction sites for a restriction endonuclease when hybridised to a complementary strand;

ii) producing an amplification structure bound to any complex ~~produced in the preceding step~~ by performing one or more times the amplification step of treating ~~said~~ the sample and locator probe with:

a) a single stranded amplification template comprising:

i) arranged in a 5' to 3' direction:

a) an extension nucleic acid sequence;

b) a hybridisation nucleic acid sequence complementary to the amplification nucleic acid sequence ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ and having substantially the same sequence as ~~said~~ the extension nucleic acid sequence; and

c) an amplification moiety, being limited in all but the final amplification step to a nucleic acid sequence; and

ii) optionally comprising at least one signal moiety being other than a nucleic acid sequence;

b) a polymerising agent ~~capable of extending~~ which extends the 3' terminus of the amplification nucleic acid sequence ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ by synthesising a complementary strand to ~~said~~ the extension nucleic acid sequence of ~~said~~ the amplification template;

c) ~~said~~ the restriction endonuclease; and

d) the reagents and conditions necessary to:

i) effect the action of ~~said~~ the polymerising agent and separating agent to allow the extension of the 3' terminus of the amplification nucleic acid sequence ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ by the synthesis of a plurality of sequences complementary to ~~said~~ the extension nucleic acid sequence of ~~said~~ the amplification template; and

ii) effect dissociation of fragments of nucleic acid strands which have been cut by ~~said~~ the restriction endonuclease activity from uncut complementary strands whilst not effecting dissociation of uncut nucleic acid strands from uncut complementary strands;

iii) detecting any bound amplification template from the amplification step or steps; and

iv) correlating the results of the detection step (iii) with the presence of ~~said~~ the target molecule.

6. (Currently amended) A method according to claim 5, ~~said~~ the amplification nucleic acid sequence (123) and ~~said~~ the hybridisation nucleic acid sequence (122) having nucleotide modifications which prevent cleavage by ~~said~~ the restriction endonuclease, and ~~said~~ the reagents including at least one modified nucleotide which, when incorporated into ~~said~~ the complementary strand by ~~said~~ the polymerising agent, prevent cleavage of ~~said~~ the complementary strand by ~~said~~ the restriction endonuclease.

7. (Currently amended) A method according to claim 5, wherein ~~said~~ the hybridisation nucleic acid sequence ~~having~~ has at least one nucleotide modification which prevents cleavage by ~~said~~ the restriction endonuclease, ~~said~~ the restriction endonuclease having single stranded, nicking activity only.

8. (Currently amended) A method according to claim 5, wherein the method is being performed isothermally.

9. (Currently amended) A method according to claim 5, wherein the method is being performed at more than one temperature.

10. (Currently amended) A method according to claim 1, wherein the amplification step of step (ii) ~~being~~ is performed two or more times.

11. (Currently amended) A method for detecting a target molecule (20) comprising the steps of[[;]]:

- i) contacting a sample with a locator probe (150) comprising:
 - a) a binding moiety (151) specific for ~~said~~ the target molecule (20);
 - b) an amplification nucleic acid sequence (152) to produce a target molecule-locator probe complex; and
 - c) optionally comprising a signal moiety being other than a nucleic acid sequence;
- ii) producing an amplification structure bound to ~~any~~ the complex ~~produced in the preceding step~~ by performing one or more times the amplification step of treating ~~said~~ the complex with:
 - a) a single stranded amplification template (160,180) comprising:

i) arranged in a 5' to 3' direction:
a) an extension nucleic acid sequence (162,182); and
b) a hybridisation nucleic acid sequence (161,181)
complementary to the amplification nucleic acid sequence ~~(152,173) of the previous amplification step or, where there is no previous amplification step, of the preceding step and~~
having substantially the same sequence as said the extension nucleic acid sequence (162,182);
and

ii) optionally comprising at least one signal moiety being other than a nucleic acid sequence;

b) a polymerising agent ~~capable of extending~~ which extends the 3' terminus of the amplification nucleic acid sequence ~~(152,173) of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ by synthesising a complementary strand to said the extension nucleic acid sequence (162,182) of said the amplification template (160,180);

c) a separating agent ~~capable of removing~~ which removes sufficient of said the extension nucleic acid sequence (162,182) of said the amplification template (160,180) when hybridised to said the complementary strand to allow subsequent hybridisation of said the hybridisation nucleic acid sequence (161,181) of said the amplification template (160,180) to said the complementary strand;

d) the reagents and conditions necessary to effect the action of said the polymerising agent and separating agent to allow the extension of the 3' terminus of the amplification nucleic acid sequence ~~(152,173) of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ by the synthesis of a plurality of sequences complementary to said the extension nucleic acid sequence (162,182) of said the amplification template (160,180); and

iii) optionally repeating one or more times the steps of treating ~~the products of the previous repeat or, where there is no previous repeat, the products of step (ii)~~ the amplification structure with:

a) a separating agent ~~capable of removing~~ which removes the remainder of said the hybridisation nucleic acid sequence (161,181) of said the amplification template (160,180) ~~of the previous repeat or step (ii)~~ when hybridised to said the complementary strand;

b) an additional locator probe comprising:
i) a hybridisation nucleic acid probe (162,182) specific to said the complementary strand ~~of the previous repeat or step (ii); and~~
ii) an amplification moiety (173), being limited in all but the final repeat to a nucleic acid sequence; ~~and~~
to produce a complex; and

- c) performing the amplification step (ii) ~~as defined above~~, optionally using an amplification template ~~(160,180)~~ different to that which was previously used;
- iv) detecting any bound additional locator probes or amplification template from the amplification step or steps; and
- v) correlating the results of the detection step (iv) with the presence of ~~said~~ the target molecule ~~(20)~~.

12. (Currently amended) A method for detecting a target molecule ~~(20)~~ comprising the steps of ~~[[;]]~~ :

- i) contacting a sample with a locator probe ~~(150)~~ comprising a binding moiety ~~(151)~~ specific for ~~said~~ the target molecule ~~(20)~~ and an amplification nucleic acid sequence ~~(152)~~ to produce a target molecule-locator probe complex;

- ii) producing an amplification structure bound to ~~any~~ the complex ~~produced in the preceding step~~ by performing one or more times the amplification step of treating ~~said~~ the complex with:

- a) a single stranded first amplification template ~~(160,180)~~ comprising:

- i) arranged in a 5' to 3' direction:

- a) an extension nucleic acid sequence ~~(162,180)~~; and

- b) a hybridisation nucleic acid sequence ~~(161,181)~~

complementary to the amplification nucleic acid sequence ~~(152,173)~~ ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ and having substantially the same sequence as ~~said~~ the extension nucleic acid sequence; and

- ii) optionally comprising at least one signal moiety being other than a nucleic acid sequence;

- b) a single stranded second amplification template comprising:

- i) arranged in a 5' to 3' direction:

- a) an extension nucleic acid sequence comprising ~~said~~ the first amplification template hybridisation nucleic acid sequence; and

- b) a hybridisation nucleic acid sequence comprising ~~said~~ the first amplification template extension nucleic acid sequence; and

- ii) optionally comprising at least one signal moiety being other than a nucleic acid sequence;

- c) a polymerising agent ~~capable of extending~~ which extends the 3' terminus of the amplification nucleic acid sequence ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ by synthesising a complementary strand to ~~said~~ the extension nucleic acid sequence of ~~said~~ the amplification template;

- d) a separating agent ~~capable of removing~~ which removes sufficient of ~~said~~ the extension nucleic acid sequence of ~~said~~ the first and second amplification templates when

hybridised to ~~said~~ the complementary strand to allow subsequent hybridisation of ~~said~~ the hybridisation nucleic acid sequence of ~~said~~ the first and second amplification templates to ~~said~~ the complementary strand;

e) the reagents and conditions necessary to effect the action of ~~said~~ the polymerising agent and separating agent to allow the extension of the 3' terminus of the amplification nucleic acid sequence ~~of the previous amplification step or, where there is no previous amplification step, of the preceding step~~ by the synthesis of a plurality of sequences complementary to ~~said~~ the extension nucleic acid sequence of ~~said~~ the amplification template;

iii) optionally repeating one or more times the steps of ~~treating the products of the previous repeat or, where there is no previous repeat, the products of step (ii)~~ the amplification structure with:

a) a separating agent ~~capable of removing~~ which removes the remainder of ~~said~~ the hybridisation nucleic acid sequences of ~~said~~ the first and second amplification templates ~~of the previous repeat or step (ii)~~ when hybridised to ~~said~~ the complementary strand;

b) an additional locator probe comprising:

i) a hybridisation nucleic acid probe specific to ~~said~~ the complementary strand ~~of the previous repeat or step (ii); and~~

ii) an amplification moiety, being limited in all but the final repeat to a nucleic acid sequence[[:]]to produce a complex; ~~and~~

c) ~~performing step (ii) as defined above, optionally using an amplification template different to that which was previously used; the amplification step, optionally using an amplification template other than the first or second amplification templates;~~

iv) detecting any bound additional locator probes or amplification template from the amplification step or steps; and

v) correlating the results of the detection step (iv) with the presence of ~~said~~ the target molecule.

13. (Currently amended) A method for detecting a target molecule according to claim 11, wherein the removal of ~~said~~ the amplification template ~~being~~ is achieved by the use of a 5' double strand specific exonuclease.

14. (Currently amended) A method for detecting a target molecule according to claim 11, wherein the removal of ~~said~~ the amplification template ~~being~~ is achieved through the use of elevated temperature.

15. (Currently amended) A method for detecting a target molecule according to claim 14, wherein said the locator probe ~~being is~~ covalently attached to ~~said the~~ target molecule prior to the removal of ~~said the~~ amplification template.

16. (Currently amended) A method for detecting a target molecule according to claim 1, prior to said detection step additionally further comprising ~~performing a method the~~ amplification step according to steps (ii) and (iii) of claim 11.

17. (Currently amended) A method for detecting a target molecule according to claim 1, wherein said the amplification moiety of ~~said the~~ amplification template from ~~said the~~ final amplification step comprising a nucleic acid sequence, and prior to ~~said the~~ detection step additionally further comprising ~~performing the amplification step according to~~ steps (ii)-(iii) of a ~~method according to~~ claim 11.

18. (Currently amended) A method for detecting a target molecule according to claim 11, prior to ~~said the~~ detection step additionally further comprising ~~performing the amplification step according to~~ step (ii) of a ~~method according to~~ claim 1.

19. (Currently amended) A method for detecting a target molecule according to claim 11, ~~said the~~ amplification moiety of ~~said the~~ locator probe or additional locator probe from ~~said the~~ final amplification step comprising a nucleic acid sequence, and prior to ~~said the~~ detection step additionally further comprising ~~performing an amplification step according to~~ step (ii) of a ~~method according to~~ claim 1.

20. (Currently amended) A method for detecting a target molecule according to claim 1, wherein the step of detecting any bound amplification template further comprises ~~comprising~~ the steps of:

- i) treating ~~said the~~ sample, locator probe and amplification template or amplification templates with a detection probe which binds specifically to ~~said the~~ amplification moiety of the last of ~~said the~~ amplification templates; and
- ii) detecting any bound detection probe.

21. (Currently amended) A method for detecting a target molecule according to claim 12, wherein the step of detecting any bound amplification template ~~comprising~~ further comprises the steps of:

i) treating ~~said the~~ sample, locator probe and amplification template with a detection probe which binds specifically to ~~said the~~ amplification moiety of the last of ~~said the~~ amplification templates; and

ii) detecting any bound detection probe.

22. (Currently amended) A method according to claim 20, wherein the detection probe ~~having~~ has a label which is detected by any one of the group of luminometry, fluorometry, spectrophotometry, and radiometry.

23. (Currently amended) A method according to claim 22, wherein the detection probe ~~being~~ is labelled with any one of the group of, FAM (carboxyfluorescein), HEX (hexachlorofluorescein), TET (tetrachlorofluorescein), ROX (carboxy-X-rhodamine), TAMRA (carboxytetramethylrhodamine), JOE (carboxy-4',5'-dichloro-2',7'-dimethoxyfluorescein), or with biotin.

24. (Currently amended) A method according to claim 1, wherein the amplification step ~~being~~ is performed two or more times, each amplification step being performed using an amplification template having a different extension nucleic acid sequence, hybridisation nucleic acid sequence and amplification moiety to that of the amplification template used in the previous amplification step.

25. (Currently amended) A method according to claim 1, wherein the target molecule to be detected ~~being~~ is a nucleic acid sequence and the binding moiety of ~~said the~~ locator probe comprising a nucleic acid sequence complementary to ~~said the~~ target molecule nucleic acid sequence.

26. (Currently amended) A method according to claim 1, ~~being~~ wherein the method is performed using more than one locator probe, each locator probe having the same amplification nucleic acid sequence.

27. (Currently amended) A method according to claim 1, wherein the method further ~~comprising~~ comprises two repeats.

28. (Currently amended) A method according to claim 1, wherein unreacted reagents ~~being~~ removed at the end of step (i), each repeat, or detection step are removed by washing.

29. (Currently amended) A method according to claim 28, wherein the unreacted reagents ~~being~~ are selected from the group of locator probe, amplification template, and detection probe.

30. (Currently amended) A method according to claim 3, wherein the amplification step ~~of~~ step (ii) being is performed two or more times.

31. (Currently amended) A method according to claim 5, wherein the amplification step ~~of~~ step (ii) being is performed two or more times.

32. (Currently amended) A method for detecting a target molecule according to claim 12, wherein the removal of ~~said~~ the amplification template ~~being~~ is achieved by the use of a 5' double strand specific exonuclease.

33. (Currently amended) A method for detecting a target molecule according to claim 12, wherein the removal of ~~said~~ the amplification template ~~being~~ is achieved through the use of elevated temperature.

34. (Currently amended) A method according to claim 21, wherein the detection probe having a label ~~which~~ is detected by any one of the group of luminometry, fluorometry, spectrophotometry, and radiometry.

35. (Currently amended) A method according to claim 34, wherein the detection probe ~~being is~~ labelled with any one of the group of, FAM (carboxyfluorescein), HEX (hexachlorofluorescein), TET (tetrachlorofluorescein), ROX (carboxy-X-rhodamine), TAMRA (carboxytetramethylrhodamine), JOE (carboxy-4',5'-dichloro-2',7'-dimethoxyfluorescein), or with biotin.

36. (Currently amended) A method for detecting a target molecule according to claim 3, wherein prior to ~~said the~~ detection step additionally further comprising ~~performing a method according to the amplification~~ steps (ii) and (iii) of claim 11.

37. (Currently amended) A method for detecting a target molecule according to claim 5, wherein prior to ~~said the~~ detection step additionally further comprising ~~performing a method according to the amplification~~ steps (ii) and (iii) of claim 11.

38. (Currently amended) A method for detecting a target molecule according to claim 1, wherein prior to ~~said the~~ detection step additionally further comprising ~~performing a method according to the amplification~~ steps (ii) and (iii) of claim 12.

39. (Currently amended) A method for detecting a target molecule according to claim 3, wherein prior to ~~said the~~ detection step additionally further comprising ~~performing a method according to the amplification~~ steps (ii) and (iii) of claim 12.

40. (Currently amended) A method for detecting a target molecule according to claim 5, wherein prior to ~~said the~~ detection step additionally further comprising ~~performing a method according to the amplification~~ steps (ii) and (iii) of claim 12.

41. (Currently amended) A method for detecting a target molecule according to claim 12, wherein prior to ~~said the~~ detection step additionally further comprising ~~performing the amplification step (ii) of a method according to~~ claim 1.

42. (Currently amended) A method for detecting a target molecule according to claim 11, wherein prior to ~~said the~~ detection step additionally further comprising ~~performing the amplification step (ii) of a method according to~~ claim 3.

43. (Currently amended) A method for detecting a target molecule according to claim 12, wherein prior to ~~said the~~ detection step additionally further comprising ~~performing the amplification step (ii) of a method according to~~ claim 3.

44. (Currently amended) A method for detecting a target molecule according to claim 11, wherein prior to ~~said the~~ detection step additionally further comprising performing the amplification step (ii) of ~~a method according to~~ claim 5.

45. (Currently amended) A method for detecting a target molecule according to claim 12, wherein prior to ~~said the~~ detection step additionally further comprising performing the amplification step (ii) of ~~a method according to~~ claim 5.

46. (Currently amended) A method for detecting a target molecule according to claim 12, ~~said wherein the~~ amplification moiety of ~~said the~~ locator probe or additional locator probe from ~~said the~~ final amplification step comprising a nucleic acid sequence, and prior to ~~said the~~ detection step additionally further comprising performing the amplification step (ii) of ~~a method according to~~ claim 1.

47. (Currently amended) A method for detecting a target molecule according to claim 11, ~~said wherein the~~ amplification moiety of ~~said the~~ locator probe or additional locator probe from ~~said the~~ final amplification step comprising a nucleic acid sequence, and prior to ~~said the~~ detection step additionally further comprising performing the amplification step (ii) of ~~a method according to~~ claim 3.

48. (Currently amended) A method for detecting a target molecule according to claim 12, wherein ~~said the~~ amplification moiety of ~~said the~~ locator probe or additional locator probe from ~~said the~~ final amplification step comprising a nucleic acid sequence, and prior to ~~said the~~ detection step additionally further comprising performing the amplification step (ii) of ~~a method according to~~ claim 3.

49. (Currently amended) A method for detecting a target molecule according to claim 11, wherein ~~said the~~ amplification moiety of ~~said the~~ locator probe or additional locator probe from ~~said the~~ final amplification step comprising a nucleic acid sequence, and prior to ~~said the~~ detection step ~~additionally further~~ comprising performing the amplification step (ii) of ~~a method according to~~ claim 5.

50. (Currently amended) A method for detecting a target molecule according to claim 12, wherein ~~said the~~ amplification moiety of ~~said the~~ locator probe or additional locator probe from ~~said the~~ final amplification step comprising a nucleic acid sequence, and prior to ~~said the~~ detection step additionally further comprising performing the amplification step (ii) of ~~a method according to~~ claim 5.

51. (Currently amended) A method for detecting a target molecule according to claim 3, the step of detecting any bound amplification template comprising the steps of:

i) treating ~~said~~ the sample, locator probe and amplification template or amplification templates with a detection probe which binds specifically to ~~said~~ the amplification moiety of the ~~last of said~~ amplification templates; and

ii) detecting any bound detection probe.

52. (Currently amended) A method for detecting a target molecule according to claim 5, the step of detecting any bound amplification template comprising the steps of:

i) treating ~~said~~ the sample, locator probe and amplification template or amplification templates with a detection probe which binds specifically to ~~said~~ the amplification moiety of the ~~last of said~~ amplification templates; and

ii) detecting any bound detection probe.

53. (Currently amended) A method for detecting a target molecule according to claim 18, the step of detecting any bound amplification template comprising the steps of:

i) treating ~~said~~ the sample, locator probe and amplification template or amplification templates with a detection probe which binds specifically to ~~said~~ the amplification moiety of the ~~last of said~~ amplification templates; and

ii) detecting any bound detection probe.

54. (Currently amended) A method for detecting a target molecule according to claim 19, the step of detecting any bound amplification template comprising the steps of:

i) treating ~~said~~ the sample, locator probe and amplification template or amplification templates with a detection probe which binds specifically to ~~said~~ the amplification moiety of the ~~last of said~~ amplification templates; and

ii) detecting any bound detection probe.

55. (Currently amended) A method for detecting a target molecule according to claim 12, the step of detecting any bound amplification template comprising the steps of:

i) treating ~~said~~ the sample, locator probe and amplification template with a detection probe which binds specifically to ~~said~~ the amplification moiety of the ~~last of said~~ amplification templates; and

ii) detecting any bound detection probe.

56. (Previously presented) A method according to claim 3, wherein the amplification step ~~being~~ is performed two or more times, each amplification step being performed using an amplification template having a different extension nucleic acid sequence, hybridisation nucleic acid sequence and amplification moiety to that of the amplification template used in the previous amplification step.

57. (Previously presented) A method according to claim 5, wherein the amplification step ~~being~~ is performed two or more times, each amplification step being performed using an amplification template having a different extension nucleic acid sequence, hybridisation nucleic acid sequence and amplification moiety to that of the amplification template used in the previous amplification step.

58. (Previously presented) A method according to claim 11, wherein the amplification step ~~being~~ is performed two or more times, each amplification step being performed using an amplification template having a different extension nucleic acid sequence, hybridisation nucleic acid sequence and amplification moiety to that of the amplification template used in the previous amplification step.

59. (Previously presented) A method according to claim 12, wherein the amplification step ~~being~~ is performed two or more times, each amplification step being performed using an amplification template having a different extension nucleic acid sequence, hybridisation nucleic acid sequence and amplification moiety to that of the amplification template used in the previous amplification step.

60. (Currently amended) A method according to claim 3, wherein the target molecule to be detected ~~being~~ is a nucleic acid sequence and the binding moiety of ~~said the~~ the locator probe comprising a nucleic acid sequence complementary to ~~said the~~ the target molecule nucleic acid sequence.

61. (Currently amended) A method according to claim 5, wherein the target molecule to be detected ~~being~~ is a nucleic acid sequence and the binding moiety of ~~said the~~ the locator probe ~~comprising~~ comprises a nucleic acid sequence complementary to ~~said the~~ the target molecule nucleic acid sequence.

62. (Currently amended) A method according to claim 11, wherein the target molecule to be detected ~~being~~ is a nucleic acid sequence and the binding moiety of ~~said the~~ the locator probe ~~comprising~~ comprises a nucleic acid sequence complementary to ~~said the~~ the target molecule nucleic acid sequence.

63. (Currently amended) A method according to claim 12, wherein the target molecule to be detected ~~being~~ is a nucleic acid sequence and the binding moiety of ~~said the~~ the locator probe ~~comprising comprises~~ a nucleic acid sequence complementary to ~~said the~~ the target molecule nucleic acid sequence.

64. (Currently amended) A method according to claim 3, ~~being~~ wherein the method is performed using more than one locator probe, each locator probe having the same amplification nucleic acid sequence.

65. (Currently amended) A method according to claim 5, ~~being~~ wherein the method is performed using more than one locator probe, each locator probe having the same amplification nucleic acid sequence.

66. (Currently amended) A method according to claim 11, ~~being~~ wherein the method is performed using more than one locator probe, each locator probe having the same amplification nucleic acid sequence.

67. (Currently amended) A method according to claim 12, ~~being~~ wherein the method is performed using more than one locator probe, each locator probe having the same amplification nucleic acid sequence.

68. (Currently amended) A method according to claim 3, further comprising two repeats.

69. (Currently amended) A method according to claim 5, further comprising two repeats.

70. (Currently amended) A method according to claim 11, further comprising two repeats.

71. (Currently amended) A method according to claim 12, further comprising two repeats.

72. (Currently amended) A method according to claim 3, wherein unreacted reagents ~~being~~ are removed at the end of step (i), each repeat, or detection step by washing.

73. (Currently amended) A method according to claim 72, wherein the unreacted reagents ~~being~~ are selected from the group of locator probe, amplification template, and detection probe.

74. (Currently amended) A method according to claim 5, wherein unreacted reagents ~~being~~ are removed at the end of step (i), each repeat, or detection step by washing.

75. (Currently amended) A method according to claim 74, wherein the unreacted reagents ~~being~~ are selected from the group of locator probe, amplification template, and detection probe.

76. (Currently amended) A method according to claim 11, wherein unreacted reagents ~~being~~ are removed at the end of step (i), each repeat, or detection step by washing.

77. (Currently amended) A method according to claim 76, wherein the unreacted reagents ~~being~~ are selected from the group of locator probe, amplification template, and detection probe.

78. (Currently amended) A method according to claim 12, wherein unreacted reagents ~~being~~ are removed at the end of step (i), each repeat, or detection step by washing.

79. (Currently amended) A method according to claim 78, wherein the unreacted reagents ~~being~~ are selected from the group of locator probe, amplification template, and detection probe.